ITEMS OF INTEREST.

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Shots from the Profession.

A NEW METHOD FOR CONTINUOUS GUM WORK.

DR. J. W. MOFFITT, PHILADELPHIA.

Undoubtedly the highest excellence yet attained in artificial dentures is shown in that originated by Dr. John Allen, of New York, nearly forty years ago, known as continuous gum work. Yet it is seldom used because of the difficulties of manufacture. During the last twenty-five years it has been my object to overcome those difficulties. My efforts have culminated in an invention that must entirely supersede the old way. This new method for continuous gum work is as follows:—

1. Each tooth has a slotted root by which it is firmly fixed in its proper place by an attachment described hereafter. This, it will be seen, obviates the risk of breaking, etching, and all other objections incident to the old method, *and avoids the necessity of soldering the teeth to the plate.*

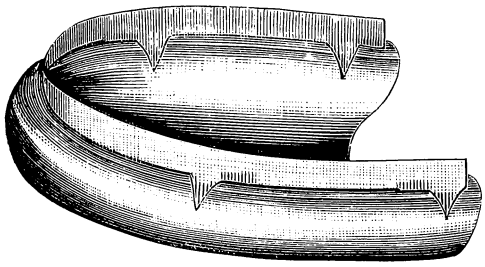
2. The body and enamel, being true porcelain and compounded with great care specially for this work, constitute a perfect, solid, and homogeneous whole, free from porosity, and as strong as the tooth itself, and *can be relied on to give uniform results.*

3. In baking this work, investments of plaster, asbestos, etc., are dispensed with. Flint sand is so used in trays as to prevent warping of the plate or checking of the body.

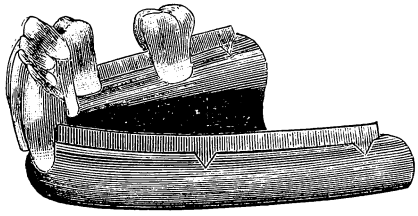
Instructions embracing all information necessary to insure success in continuous gum work by our method are simple.

The plate (platinum) is fitted to the mouth in the usual way, after the bite has been taken and the case put in the articulator, a strip of platinum curved to the desired position, to be used for the adjustment and retention of the teeth, is soldered to the plate with pure gold at four points, viz.: between the cuspids, the first bicuspids, and at the ends of the strip. This platinum strip is cut with two V shaped projections at each of these points, one to be turned in and the other out,

so that when soldered to the plate the strip will not touch between the soldered points, (see cut). The plate is then cleansed with nitric acid, after which it is ready for the reception and adjustment of the teeth.



The teeth as in the cut are made with slotted roots so as to admit the platinum support, and are placed in position by grinding them so they will rest firmly on the plate inside and out of the support. This is bent to accommodate any deviation of the teeth from the general curve, (see cut). After the teeth are arranged they may be tried in the mouth; when, if the articulation and arrangement are satisfactory, they are ready for the application of the body.



The body is then mixed with water to the consistency of thick paste, and applied to the plate and teeth with a small spatula, packing it by tapping during the process, and absorbing excess of water with a napkin. After the body is packed around the teeth, inside and out, it is ready for carving which should produce as close an imitation of nature as possible. Now cover the palatal arch with body about the $\frac{1}{16}$ of an inch in thickness, packed as described, and carved to imitate the rugas, etc. After brushing all particles from the plate and teeth it is ready for baking.

The tray is half filled with pure flint sand after it has been subjected to a bright red heat to free it from impurities. The piece, teeth up, is then placed on this bed of sand (popularly known as silver sand), and all parts except the teeth covered with the sand. A test piece of the body is placed on the sand covering the palatal arch. Now introduce the tray gradually into the muffle of the heated furnace, by placing it in front of the muffle and moving it forward about an inch at a time,

with intervals of about ten minutes, till it is in its place for baking. Then close the door for about five minutes; now push it still further back and raise the heat to the fusing point of the test piece. Then withdraw, place in a muffle, close, and allow to cool; after it is cold—not before—remove, and if free from imperfections—which is generally the case—it is ready for the gum enamel. Mix the enamel with water to the consistency of thin paste. Apply it with a spatula to about $\frac{1}{32}$ inch in thickness, or as the depth of color desired may indicate. After the enamel is applied, wash it down around the necks of the teeth with a camels-hair pencil, and with a dry brush cleanse the teeth and plate of any adhering particles of enamel. It is now ready for fusing. Place it on the sand in the tray, being careful to brush away the sand so that it will not come in contact with any part of the enameled surface, and then carefully introduce into the heated muffle as at the first baking. When the enamel has flowed smooth, withdraw and place in a previously heated muffle; close, and allow to cool.

REPAIRING.

After washing the piece and wetting a slide, mix two measures of asbestos with one of plaster, and pour this on the slide to the depth of ¼ inch. Place the case on this and cover entirely to the thickness of another ¼ inch. Dry it, then heat it in the muffle to a red heat, when it is to be withdrawn and set aside to cool. After breaking the plaster and asbestos from it, and cleaning by brushing, new teeth, or body and enamel, as the case requires, are added. Then proceed with the baking according to directions for a new case.

TEETH WITH DEAD PULPS.

DR. GARRET NEWKERK, CHICAGO.

The treatment cited and advised by Dr. Mills in the March ITEMS as to teeth containing dead pulp, while it may often do in his hands, appears to me not the best to advise for general adoption.

The doctor finds a case, not uncommon,—a molar tooth "with fistulous opening over the buccal roots." He "drilled directly through the grinding surface to the pulp-chamber, then enlarged the opening enough for access to the pulp channels." Then he thoroughly sterilized the cavity. So far good.

Then "enlarged the palatine canal with a flexible reamer in the engine, dipped in creosote, which passed through the apex I opened."

I understand from this, the engine-reamer was made to pass through the end of the palatine root. I am afraid of that. The end of a molar root is often bent. What assurance can we have that an engine-reamer driven even at low speed, will not leave the canal at the turning point

and pass directly through the walls, making a new channel? If the operator by the sense of touch detects the change and stops short, he will have made it impossible to follow the natural canal with a broach. If he goes through the apex he may or may not strike the fistulous track, probably not. Five to one, however, he will wound the peridental membrane with the end of his drill.

Now, in opening a pulp-chamber we often strike a mass of matter dangerously septic to any wound in the soft tissues. A palatine root canal is large enough to contain considerable of such matter.

Who has a touch delicate enough to pass an engine-broach through such substance and through the end of the root without danger of wounding and innoculating the peridental membrane with an infectious poison, even in spite of his creosote?

When a tooth with a dead pulp, without fistula is opened, though it has given little or no trouble, it often happens that the operation is speedily followed by violent pericementitis. It would seem the conditions are such as to only require the introduction of some micro-organism from the air to make this the theater of an active fermentation with dangerous products. And in many instances we may fear these organisms, or their products, have been carried through the roots by careless manipulation of broaches and drills.

In the case described by Dr. Mills, he does not state that he ascertained definitely from which root the abscess proceeded. He says there was a "fistulous opening over the buccal roots." He proceeded to enlarge the *palatine* root canal, and, as we understand, passed the "reamer" through; then forced "aromatic sulphuric acid into the opening," and "through the pulp canals as much as possible into the diseased territory about the roots of the tooth;" then he says, "I allow that to be absorbed," etc. Now, as the "fistulous opening over the buccal roots" probably proceeded from *one* of those roots, or if not, from the palatine root alone, the "diseased territory" was probably likewise limited.

Is it necessary to assume there was "diseased territory," except along the fistulous track? Is it good practice to drill through a root from which a fistula *does not* proceed, the surroundings of which are probably healthy, with the danger of innoculating the peridental membrane with septic matter, and then force any irritating substance through such root into innocent territory? Is it sufficient to say: "Do not dispute this, but do it," unless the practice appears based on correct principles? Is it not more reasonable to advise, where we find putrid pulps, that the principal pulp-chamber be carefully cleansed, using caution, that no instrument exerts the least piston force to carry poison beyond the apicial foramen of either root? Then, before attempting

to pass a broach, least of all a drill, to complete the operation at one sitting, quietly insert a bit of cotton or spunk super-saturated with a good disinfectant (avoiding piston force), and leave this in for some hours or days, till there has been thorough disinfection of the remaining contents, probably to the very apex of the smallest root. Then with a fine broach wrapt with a few fibers of cotton, sterilized carefully, remove any remaining loose matter.

Now, we have our tooth clean and aseptic, and have not interfered with the peridental membrane. We can also discover to a certainty by the character of fluid in the roots from which proceeds the fistula, if such there be. Having *cleansed* the root we have only to cleanse the track of the fistula with an *innocent* disinfectant (the best is the hydrogen peroxide) and the root is ready to fill. In multiple rooted teeth the others may as well have been filled previously.

Again, I do not think the most of us are prepared to accept without question the plan of filling root canals with wooden sticks, as recommended by Dr. Mills. Certainly, if I were going to use any solid plug I should prefer metal, gold, lead or silver, which would not smell, shrink, or absorb; and insert one of these with cement, or gutta percha solution. I am content with the gutta percha cones in all canals large enough to receive them, and with the liquid gutta percha (gutta percha dissolved in chloroform) in others.

Finally, are we to accept as scientific this advice? "If you have a doubt as to future pain, *prick* it, that is, through the gum and alveolar process in the line of the apical territory." I think there is no need of creating the conditions which would make such a proceeding necessary; no! not one in a thousand times.

Mr. Editor, I am not actuated by a motive of mere criticism; but these articles in your journal are widely read and are liable to have great influence for good or ill. Writers should be very careful indeed of what they advise. Speaking for myself I wish to say, if I am ever found advocating a line of practice that will not bear a good defense, I want the opposition to be of the boldest character. And I hope no one whom I may answer will take my opposition unkindly, for it is never given in an unkind spirit.

Dr. Eames, in speaking of attending the American Dental Association says: "I went to Niagara Falls mainly to attend the meeting of the College Association, and was sadly disappointed in the meeting of the American Dental Association. The time and attention of many of the members was devoted to fighting for the offices; and unless a change for the better is made, the days of the Association will be short. We hope the last of such exhibitions has been seen.—*Luminary.*

PARTIAL LOWER DENTURES.

DR. L. P. HASKILL, CHICAGO.

No class of cases are more difficult to make, or to wear, than partial lower dentures.

Success depends on adaptation, and the foundation of this is a correct impression. To secure this plaster must be used. Select a cup with an opening for the anterior teeth. If there are molars which will prevent the cup going as deep as necessary, place some wax on the sides, laying a piece of *wet* paper over the opening in the plate, to hold the plaster; after filling the cup, press the plaster away from the anterior edge so it will not run *outside* the teeth any more than possible; also, in case of molars, do not let the plaster cover them; this is to facilitate the removal of the impression. In removal, press the impression inward. Of course, occasionally, there will be some breakage, but the pieces will go into their places and a perfect impression is the result.

Never take the impression in wax first as there will be just as much breakage, often more; and over the wax in some places, the plaster will be so thin, that it will be impossible to find and restore the pieces. Besides, there is nothing gained by the use of the wax.

In these cases the plate should always extend up on to the neck of the teeth, from an $\frac{1}{8}$ to $\frac{1}{4}$ inch, according to length of teeth. It affords a better support for the plate, and in many instances the plate needs to be made so shallow in the middle that it will not be wide enough for strength, unless made higher.

Clasps may be used, but should be narrow and thin, and nicely adjusted to the teeth. Plain teeth should *always* be used with rubber attachments in case of gold plates, because the teeth can be more nicely articulated.

In this class of cases there is a constant tendency for the gums to give away, on account of the severe pressure on a narrow ridge so far back where the pressure is greatest. This being so, the teeth become too short; and, to re-place them in position if they are attached to the gold plate with rubber, they can easily be removed and re-set with a partial set where the upper teeth are natural. Care must be taken not to throw the pressure on the artificial ones; constant irritation and rapid absortion of the process ensues; the effect being entirely different than if distributed on the whole jaw, as in a full denture; or, with a full upper denture, there cannot, or will not, be as much pressure exerted.

In adjusting in the mouth see that the plate is not raised by the lifting of the tongue to the palate, nor by lifting the lips with the

fingers. Tell the patient it will, of necessity, require more patience to learn to use them than a full set, and if there is irritation to call at once and have it relieved. Often the last molar on the plate is left too long, so that the plate is crowded into the jaw at the end, and the dentist will *file the plate*, instead of shortening the tooth.

Do not allow the plate to extend too far back, only just on to the upward turn at the end.

ALCOHOL.

J. F. SANBORN, M.D., D.D.S., TABOR, IOWA.

The voice of all nature is that alcohol is matter within the realm of death and decay. The effinity of alcohol for oxygen is like that of a drunkard for whisky—it must be closely imprisoned where oxygen is absolutely out of its reach or it will have it if stealing will procure it, and thus get down into the gutter with other dead matter, where it will be in a quiescent state of stable compounds, as carbonic dioxide and water. When a man imbibes it, is it a wonder that he too should sink into the gutter? When we take food into the stomach it is digested; if alcohol is taken does it digest? No. It does not remain there and digest like milk or bread; it is at once absorbed by the veins of the stomach and by the portal vein to the liver, and from there to the heart and lungs; in ten minutes it may be scented in the breath.

There is a prevailing belief that alcoholic bitters promote digestion and therefore are a benefit. The stomach digests the nitrogenous food by the gastric juice, the solvent powers of which are in the pepsine therein contained. If you add alcohol to the gastric juice of some animal the pepsine will be changed from the fluid active form to the solid inert condition.

Todd & Bowman tells us that: "The use of alcoholic stimulants retards digestion by coagulating the pepsine and thereby interfering with its action." "Were it not that wine and spirits are rapidly absorbed from the stomach they would be a complete bar to the digestion of food, as the pepsine would be precipitated from the solution as quickly as it was secreted by the glands of the stomach." So much for its help in the process of digestion.

"When alcohol has entered the circulation it spreads through the liver, heart, lungs and brain; it penetrates every organ and traverses every tissue, and leaves no part unvisited." Prof. E. L. Yeoman says: "Our first necessity is for air to breathe, and secondly for water to drink; God has supplied the one equal to the demands of all the animal kingdom and it is always everywhere present; the other is so abundant as to cover three-fourths of the surface of the globe, and so

essential that where it abounds, there life is exuberant, but where it is lacking we find the desert."

Prof. J. N. Carnahan, of New York City, says: "I must declare I always look on patients who have been in the habit of using spirituous liquors as least likely to recover from serious maladies, or from shocks following capital operations; and also as patients most likely to require a longer time for cure of diseases of a more simple character." "I have at times met with cases of fracture of bones occurring in persons of intemperate habits in whom the bones would not unite by bony union, but remained flexible and useless."

Thus persons jeopardize both life and limb by the use of alcoholic liquors.

Dr. Huntsman, Pres. of the Iowa State Medical Society, said in his annual address in 1885: "The impression prevails that intoxicants are indispensible in concussion, collapse, typhoid fever, consumption, dyspepsia, and kindred diseases; but a long course of observation and experience has forced me to the most positive conviction to the contrary. In typhoid fever, who would to-day rely on intoxicants, when an ounce of beef-tea will accomplish more toward recovery than a pint of whisky? I probably ought to ask pardon of the beef-tea for the comparison."

Alcohol introduced into the system may be divided into three parts:—

1st. A portion is removed from the blood through the lungs in the breath. This part occasions the least injury.

2d. A part is decomposed by the action of oxygen; and

3d. The part that is neither expelled in the breath or decomposed by oxygen, but remains in the systen for a variable time as alcohol.

As all combustion and decay is affected by the action of oxygen, this third part will preserve the tissues from its action, as oil will prevent iron and steel from rusting, so that the tissues that have subserved the ends of life as living structure, and which should be removed to give place to new, is not, but is preserved by alcohol just as animal tissues are preserved in a bottle of spirits. Such persons become pursy, and may be called fat. It is abnormal matter, preserved in alcohol, and is carried about as a mass of useless substance, that would go to decay at once, but for the preserving influence of alcohol. A person in such a condition may well say: "Who shall deliver me from the body of this death?"

Persons of aldermanic proportions produced from this cause may boast of their healthful appearance, when in fact the vital activities are at the lowest ebb, and should disease supervene, almost sure death must follow.

THE COMPENSATION OF EXPERT WITNESSES.

FRANCIS H. ATKINS, LAS VEGAS, N. M.

The decision of the Supreme Court of Alabama is the only one I learned of that is wholly averse to the expert. *Ex parte* Dement, 53 Alabama, 389, is the title. The learned judges held that "in so testifying he would not be practising the healing art . . . he would be deposing only to things which he had learned in the course of his occupation or profession," etc. In Summers *vs.* State, 5 Texas (App.), 374, in 1879, the court followed the Alabama precedent closely.

The most important decision in favor of the physician was rendered in the Supreme Court of Indiana in 1877, and is entitled Buchanan *vs.* State, 59 Ind., 1. This is by far the most interesting and complete discussion of the whole subject, and should be well known by every physician. It was held that, "while a physician or surgeon could be required to attend as a witness to facts without other compensation than that provided by law for other witnesses, yet he could not be required to testify as to his professional opinion without the compensation of a professional fee. The professional knowledge of an attorney or physician is to be regarded in the light of property, and his professional services are no more at the mercy of the public, without remuneration, than are the goods of the merchant, or the crops of the farmer, or the wares of the mechanic." "When a physician testifies as an expert by giving his opinion, he is performing a strictly professional service," the exact reverse of the Alabama decision.

Curiously enough, this acute decision of the Indiana Supreme Court did not satisfy the bucolic legislators of that State, for in their Revised Statutes, 1881, Sec. 504, is a provision that "a witness who is an expert in any art, science, trade, profession, or mystery, may be compelled to appear and testify to an opinion as such expert" without other pay than that of an ordinary witness.

In U. S. *vs.* Howe (12 Cent. L. J., 193), the United States District Court for the District of Arkansas decided in the same manner as the Indiana Supreme Court.

There are statutes in Iowa, Rhode Island, North Carolina, and South Carolina, granting extra compensation for expert witnesses; that of Iowa seems to be the best—the "compensation to be fixed by the court with reference to the value of the time employed, and the degree of learning or skill required." South Carolina fixes the pay at $10 per diem in addition to the ordinary witness fees and mileage.

The New Mexico Medical Society has prepared a bill which is now before the Legislature at Santa Fé, which provides that any person, of whatever trade or profession, called to testify as to his professional opinions, shall receive extra compensation to be fixed by the court,

the minimum to be $10 *per diem*, the amount to be regulated by the time and skill engaged, and providing that not more than two experts can be called on a side. The object of the last provision is to prevent the accumulation of excessive costs. Its passage intact is doubtful.

In the Indiana decision are several references to cases of interest.

Webb *vs.* Paige (1 Carrington and Kirwein, 23), an English case in 1843. The expert was a cabinet-maker, and having objected to testifying without compensation, the Court (Maule, J.) held that a witness called to depose to a "matter of opinion depending on his skill in a particular trade has, before he is examined, a right to demand from the party calling him a compensation for his loss of time, and there is a distinction between a witness thus called and a witness who is called to depose to facts which he saw."

Greenleaf on Evidence: "The latter (an expert) is under no such obligation, and the party who selects him must pay him for his time before he will be compelled to testify."

Webb *vs.* Baird, 6 Indiana, 13. In favor of the expert, in this instance an attorney.

Blythe *vs.* the State, 4 Indiana, 525. Blythe, an attorney, objected to defending a pauper by order of the court, unless compensated. The Supreme Court sustained him.

People *vs.* Montgomery, 13 Abb. Pr. (U. S.), 207 (1871). Here it was held that an expert cannot be compelled to examine a case or otherwise prepare himself for testifying.

In the Texas case above it was decided that a physician may be compelled to testify as to the result of a post-mortem examination made by him, bnt he cannot be compelled to make such an examination.

Also, Moch *vs.* City of Buffalo, 13 Rep., 251. Haynes *vs* Mosher, 15 How. Pr., 216.

In Re Roelker, U. S. District Court, Mass., 1854, the court decided in favor of the expert, in that case an interpreter.

Editorial in *Boston Medical and Surgical Journal*, December 22, 1881, concerning case in Superior Court, Boston, Mass. Court held "that a physician is not bound to give his professional opinion for nothing in court any more than anywhere else."

Other references are: "Duties and Privileges of Expert Witnesses," *Phil. Med. Times*, January 6, 1877; *Reese's Manual of Toxicology*, Philadalphia, 1874; *Phil. Med. Times*, February 11, 1882, p. 332; *Phil. Med. News*, March 11, 1882, p. 283. See also Judge C. C. Fuller's decision in Michigan, case of State, *vs.* Vanimman's, where the expert was sustained, in *N. Y. Medical Record*, April 3, 1886, p. 395; *American Journal of the Medical Sciences*, October, 1882, p. 546.

The standard works of Ordronaux, Med. Jur., Sec. 114, Taylor and Wharton have passages sustaining experts in their right to extra compensation; also Redfield is named. Honeyman's Practice and Precedents, Sec. 447. Snyder *vs.* Iowa City, 40 Iowa, 616. Code of Iowa, 1873, Sec. 3814. Dille *vs.* State, 59 Indiana, 15.

From Massachusetts I learn that "the common law permits the court to allow extra fees to experts, and such a fee is always allowed witnesses for the commonwealth. Medical experts usually receive $25 a day, and those from a distance sometimes get more; but this is optional with the court, and a physician can be compelled to testify for the usual witness fee." See this discussed by F. W. Draper, M.D., in *Boston Medical and Surgical Journal*, August 2, 1883, p. 93, where the other relations of the expert witnesses, besides his compensation, are well considered. In the same journal, July 7, 1881, Dr. Walter Channing treats the same topic, and quotes a proposed law regulating expert testimony.

Again, in *The Medical Record*, June 25, 1881, p. 722, is mentioned certain action of the Rhode Island State Medical Association.

The most complete presentation of the subject is to be found in Lawson's "Expert and Opinion Evidence," where the Indiana decision is given in full, as well as that of the Alabama Supreme Court.

I have no doubt that a more thorough search than I have been able to make, so "far from the maddening crowd," would reveal much more material on this subject, in which every physician has an equal interest. To favor completeness, let me add the references to Tidy's "Legal Medicine," and Mr. Henry A. Riley's contribution on the "Law of Expert Evidence" in the "Reference Handbook of the Medical Sciences." It is rather surprising that the opinion of an author so highly esteemed among all English-speaking people as Simon Greenleaf should not have constrained all our courts long ago to a unanimity of principle and action as regards compelling and compensating expert witnesses.

The other relations of the expert, whether as a partisan or an impartial scientific witness, his privileges and his woes in the courts, his duties and details as to his manner of giving his professional opinions, have all been much discussed also by physicians and by lawyers of liberal views.—*Med. and Den. Journal.*

Mixing Amalgam.—Take a small rubber ball such as the children use for playing with and cut it in two, use the chip that it forms for mixing with a large round ended instrument for a muller.

Tioga, Pa. DR. C. THOMAS.

My, what an array of talent?—The *Archives* has now 3 editors in chief, 47 State editors, and 30 chief correspondents.

A QUESTION OF RESPONSIBILITY.

DR. FRANK W. SAGE, EDITOR MEDICAL AND DENTAL JOURNAL.

In the nature of things, the dentist discovers early in his practice, that he is to be held largely responsible for the results, good or bad, of his ministrations. In his ignorance of what he may or may not promise, he is more than likely to place himself in an attitude toward his patrons in which complaint of failure, early or late, is sure to bring to him mortification. This is the inevitable result of an overweening confidence, and it often costs him dearly. Perhaps as a student he paid the less attention to such instances of failure as met his observation, because of a vain belief in the saving grace of perfect manipulation, nicity in attention to details, and thoroughness of finish, such as he confidently expected always to observe. Wedded to the teachings of his particular school, he perhaps regarded with indifference or even contempt the opinions of those who differed in theory or practice with his preceptors. It is little to him that no invariable course of procedure in given instances, could be designated; he had his views of exactly what was required, and those views he addhered to with a pertinacity born of a belief that his preceptor's opinion, or of his favorite professor in the college, admitted of no question. This we believe, is not an exaggerated portrait of the average young graduate. Possibly we were, all of us, once equally confident; equally prepared to demonstrate that failure is the result of incompetence as invariably as success is the reward of proper attainments. Years have passed, and to most of us they have brought the unwelcome and humiliating evidence that much of what we expected to be of life-long durabillity, has fallen into ruin. Not all at once was the revelation made. From this quarter and from that, testimony extending through weeks and months and years, accumulated. Here a filling lost, there a capped pulp inflamed, here again an abscess like a slumbering volcano breaking out anew—all combined to rouse us at last to a full apprehension of numerous failures where we had counted on success. The anxiously looked for end of this train of calamities was never in sight; on and on the troop march, each day adding to the number, in an endless array. It is a new and disagreeable experience to us, and we undertook gratuitously, perhaps, the task of "making good" the loss entailed on our patrons. Thus unwitingly did we commit ourselves to the false and unjust principle that the dentist is rightly held responsible for his failure. But after a time it probably occurs to even the most obtuse (and well-disposed) of us, that the dentist who undertakes, without compensation, to keep his work in repair, assumes more than the tailor, the bootmaker, or any other artisan. Conscience argued yes, but your patrons underwent suffering and annoyance with the understanding either im-

plied or expressed that the work was to be durable. It is not that you took no account of contingencies; had you known and boldly announced the uncertainty of the results, you would possibly have lost your patron. Self-interest comes to the rescue with this plea: I did not know, because I was never so taught, and I cannot assume all the responsibility. Comparing these views side by side, the dentist concludes in his unfortunate dilemma, to repudiate reponsibility. I am not justly accountable, in the nature of the case, and no fair-minded person would so hold me. I will charge for all repairs just as if I had never done the work. With this determination he goes on his way, conscious that a majority of his patrons may regard his course as arbitrary and unfair. So he labors for other months and years under a disadvantage, which perhaps he never outlives.

From the consideration of numerous instances like the above, the question arises, why should the dentist be expected to be responsible for his work? The physician precribes and fails, and prescribes again; and a fee is charged for both prescriptions alike. The lawyer is not accessible to the plea that his advice was wrong; he does not on that account remit his fee. Is the real difference after all, between the failure of the dentist and of the other professional men, only in the tangible evidence that failure exists? We suspect it is so. But granting that the failure of the physician or of the lawyer, is frequently obvious, the fact admits of no question that the average physician or lawyer encourages no such expectations of unvarying success as are commonly held forth by dentists. The members of our profession have themselves only to blame for allowing the *onus* of responsibility for failure in the majority of cases to rest on their own shoulders. The prevailing disposition to force the responsibility of failure on him is the natural fruit of his own willingness to bear it. The patient who bluntly announces to his physician, "doctor, your medicine has not helped me;" does not after all expect as much by way of repairing the failure, as another who informs his dentist that a filling has fallen out. The erroneous impression so widely prevalent that dental operations ought not to fail, is mainly set afloat by the teachings and assurances of ignorant and thoughtless members of our profession. To avoid future mortification and annoyance, the dentist would act more wisely were he to frankly state the uncertainty of the final outcome of his best efforts. The truth is, many learn little by observation. A careful forecast of what may be expected from what is seen already to have occured, does not enter into the calculation of many. Filling teeth does not remove predisposing causes of decay, and common sense at once cautions us to be sparing in our promises of immunity from future trouble of that kind. We may erect a fine superstructure on a frail

foundation, but we are not justly called on to insure the foundation. At the same time it becomes the dentist's duty to call attention to the quality of the foundation, so that the patient may distinctly understand to what extent the dentist holds himself liable for failure. We hear and read much about the cause of failure—failure resulting from the recurrence of decay—but nothing has been written, to our knowledge, about fillings coming out; yet fillings of good operators come out—are pried out, broken out—in spite of grooves, pits, and retaining screws. Who is responsible? Not always the dentist. The contractor who engages to build a bridge or other structure, carefully surveys the ground and notes the character of the foundation on which he is expected to work. Probably the plans and specifications furnished him denote more attention to requirements for rendering the foundations secure than to the superstructure itself. But the dentist is furnished no plans nor specifications, and it is not within his province to improve the foundations which nature has furnished. The physician is often compelled to admit that he can only mitigate, not cure, the patient's ills. The lawyer hears his client's statement and undertakes or rejects the case according as the evidence offers prospect of relief or not. By such deliberate considerations the dentist's undertakings should be regulated. With an explicit understanding between patient aud dentist, in the first place, the possibility of subsequent complaint and reproach would be largely removed.

ST. PAUL DENTISTS AND ARTIFICIAL TEETH.

The dentists of St. Paul are evidently waking up. Their monthly meetings really mean *business*. Their February Session, two evenings long, was on artificial teeth. The essay of Dr. Geo. V. T. Brown, which led the discussion, is a detail of the materials entering into American teeth and the mode of their manufacture. This would be interesting reading to our readers if we had not already treated them to two articles on this subject.

The general drift of the discussion was that there are improvements still to be made in this line, though we should be thankful for the pains taken by manufacturers to keep up with the wants of the profession. The opinion of all was that American teeth are not inferior to English teeth, and that in some respects they are superior. This difference is specially marked in subjecting both to high heat. "The actual difference," says Dr. Brown, "in the materials and the process of manufacture, were quite forcibly brought to my mind by a test, which through the kindness of the manufacturers of the Wilmington Dental Tooth Co., I was enabled to see. Three teeth of Ash & Sons teeth were placed on the same slab with three of their own manu-

facture, and subjected to the heat of their furnace long enough to allow an unbaked tooth to become completely hardened; on removal, the English teeth were gone, three little round white balls being all that was left to represent the perfect specimens of a moment before, while the Wilmington Co.'s production remained unchanged, even in color. This was the complete demonstration of the utter worthlessness of teeth I had used, and I regret to say in good faith recommended freely, and a revelation to me more forcible than pleasant of the fact that I had been too easily led to overlook the necessity of examining the quality through their attractive appearance."

Dr. Weeks: The reason so many handsome teeth are used is because patients insist on choosing what please their fancy. The patient should have no voice in selecting teeth. If in every instance, the dentist strictly uses his own judgment, the many pretty but unnatural looking teeth will soon disappear; and natural appearing and artistic teeth prevail.

Dr. Bailey: I am tired of trying to have my own way. I lose my patience and my patients. I think we shall never get natural looking teeth while we make gum sections. Teeth should be carved as in olden times, not molded.

Dr. Gould: If patients are managed properly there is no trouble. At any rate, the dentist should not yield to his patients against his own judgment.

Dr. Hale: I think it is unnecessary for a tooth to withstand so high a heat as to melt them, or to even change their color.

Dr. Thompson: In soldering it is necessary for teeth to stand a great heat without changing color or cracking, specially in bridge work.

Dr. Goodrich: A piece of bridge-work came under my notice two weeks since, on which were to be soldered one of White's teeth and one of Ash's. On removing the bridge from the investment after soldering, the American tooth was all right, but the English tooth was split completely through.

Dr. Gould: We use too many block teeth. We can articulate better with plain teeth. Use your patient kindly and do what is right and you will have no trouble. Make the patient a friend.

Dr. Lyon: I can mention many instances of much inconvenience in the loss of color and cracking of English teeth while soldering.

Dr. Brown: I find the flat teeth of the Wilmington manufacture in many respects the most satisfactory for bridge and crown work; and I prefer those with small pins, because of the decreased danger of cracking.

The following was passed unanimously:

Resolved, That a committee of three be appointed to confer with the members of the society and honorary members of Minneapolis and elsewhere to secure their co-operation in an effort to gather suggestions for possible practical improvements in the form, quality and appearance of mineral teeth; this committee to report at each subsequent meeting till ideas may be developed of sufficient importance to warrant their submission to manufacturers, in the hope that they will join us in striving for desired improvements.

Second.—That a vote of thanks be extended to the management of the ITEMS OF INTEREST for kindness in offering to publish the proceedings of our meetings.

A NEW HAND-PIECE ATTACHMENT.

DR. S. G. PERRY, NEW YORK.

For a long time I have believed that to get the best results from a dental engine the cord must be run directly over a pully attached to the spindle of the hand-piece. Only in this way, so far as I know, can a steady, lathe-like motion, free from "back-lash" and noise, be obtained. Undoubtedly this steadiness of motion makes the engine more bearable to the patient, as well as more satisfactory to the operator. For this reason I formerly used the Suspension engine, but for several years I have adopted the Bonwill, attaching to it at different times the Bonwill or the Hodge hand-piece. I have considered the Bonwill engine a great step in advance of the Suspension, mainly because different tensions can be given to the cord, because the weight is taken off the hand by the spiral spring which supports the arm, and because of its great freedom of movement.

But I have never been satisfied with Dr. Bonwill's method of attaching the hand-piece to the arm. Though it has advantages, it has some disadvantages which to me have been so great that I have been led to attempt to overcome them. I have therefore devised an attachment by which I am able to combine the advantages of the Elliott Suspension and the Bonwill engines. The hand-piece, I use is the Hodge (which ought, however, to be called the Weber hand-piece, as it is the result, I believe, of Mr. August Weber's ingenuity), and the means of attaching it to the arm of the Bonwill engine suggests the manner in which the cord runs over the spindle of Elliott Suspension. There are four small pulleys attached to a block, which swivels around the end of the hand-piece in such a way as to hold the cord in unvarying relation to the pulley attached to the spindle.

This block is hinged to the arm of the engine and also made to swivel around it. As only two of the four pulleys run at any one time, the friction is not increased, and in changing from one position to another the cord is crossed between the pulleys and what may be called the elbow-joint of the arm, instead of between the pulleys and the wrist-joint as in the Bonwill. This avoids the disagreeable crossing of the cords in such a short space as to often jump off the pulleys and twist. If the pulleys are set a little further away from the hand-piece, as Dr. Bonwill prefers to have them, evidently to avoid this danger, then there is a greater drag on that side of the hand-piece, and a feeling of awkwardness which I have never been able to become accustomed to.

By adopting a small braided fishing line, the ends of which I put together without splicing, and sew with fine silk, I get rid of the bunch which is made by using corset cord united by putting one end into the other, and I can therefore place the small pulleys close to the main pulley without danger of feeling the "jump" made by the bunch on the corset cord passing over three pulleys so near together. The fishing-line is firm in texture, and by using rubber bands on the engine wheel and on the spindle pulley, as advised by Dr. Wardwell, the line can be run with loose tension without slipping. By making separate bearings for the pulley spindle, which is done without increasing the friction perceptibly, the hand-piece can be detached by unscrewing, and the right-angle attachment secured directly to the pulley block. This gives great steadiness of motion to the right-angle attachment and adds greatly to the efficiency of that instrument. I have cone-journals in the pulley block with a set-screw for taking up wear, and all the parts can be easily taken apart to be cleaned and oiled. This makes a device which will practically never wear out. I have also designed a shield to protect the hand from the main pulley, as well as to shield the hand from a careless application of oil to the small pulleys.

The small pulleys have no side bearings, but run free on the pins, being always kept in place by the cord as it passes over the spindle pulley. This absence of friction adds to the free, light feeling of the hand-piece, when operated in different positions.

There is absolute freedom of movement of the hand-piece, except when it is held in one position. When the hand-piece and the arm are held nearly in a line with each other, the pulley block does not readily swivel. This is easily overcome by raising or lowering the extension arm, and what might at first seem to be a fault proves to be even an advantage, because this change of position in either direction brings the cord over the pulley at nearly right angles to the spindle,

and therefore lessens the friction of the side rollers. In fact, after a little study of this attachment, I think it will be seen that while there is no possible position that cannot readily be reached by it, it will also be found that in most of the work on the teeth the cord actually runs over the spindle at nearly right angles. This relation of the cord to the spindle is the secret of its remarkable lightness, as well as steadiness of feeling in the hand.—*Trans. Am. Den. Ass'n.*

HERBST'S OBTUNDENT.

DR. C. F. W. BÖDECKER, NEW YORK.

[In American Dental Association.]

I think it is of the utmost importance to the dental profession that they should know about this obtundent. More than a year ago, when I was in Europe, Dr. Herbst showed me this obtundent. At that time I was a little careful and did not know whether I should dare to bring it out, but since I have experimented with it I can say that I think it is safe. The obtundent consists of chemically pure sulphuric acid saturated with hydrochlorate of cocaine, which is added while stirring it with a glass rod, till it is perfectly dissolved. (This at the same time is a test for chemically pure cocaine. If the sulphuric acid remains uncolored, the cocaine is pure. If the sulphuric acid gets dark, it shows impurities.) Then to this solution of sulphuric acid and cocaine you add sulphuric ether to the point of supersaturation, stirring it with a glass rod, not shaking it, because if you shake it and put a cork in the bottle, the expansion is very great and the bottle may break; therefore it is much better to do it in a long test tube and to use a glass rod and stir it while adding the ether. The ether which is not taken up by the sulphuric acid will be on the top of this fluid, and has to be evaporated by means of a chip-blower or by standing. A little of this is then taken on a piece of cotton and applied to the cavity of the sensitive tooth. The effect is really beautiful. I have had it applied to four of my own teeth, and I am satisfied that it does the work nicely, more so than any other obtundent that I ever used. It cannot obtund the whole of the cavity at once, but it will only obtund a certain layer, and you will have to reapply it, but the action is so rapid that usually within two minutes after the application is made excavation can be proceeded with. While in Bremen last year, Dr. Herbst called my attention to this obtundent again, and I told him I should be somewhat afraid of it, and he said, "Do me the favor to go with me to several of my patients on whom I have used it." I went with him and saw a young lady, about ten years of age, with very delicate teeth that under no circumstances whatever would I have filled with gold. I said, "Why do you fill these teeth with gold?" He told me that when he applied

this obtundent, he found that they would stand with gold better than with anything else he could put there. Dr. Herbst said, "I do not myself know why." The edges of these cavities were absolutely perfect. The teeth were of a very delicate character. I saw three cases in which he claimed he had used the obtundent, and in none of them did I see any bad results. In one of them Dr. Herbst claims that the pulp had been exposed, and he had used the obtundent and capped the pulp, which was found to be alive. The sensibility under the operation is usually very little. I do not think there is such great danger as Dr. Truman speaks of. In fact, I have had it applied to four teeth in my own mouth, and I hope to show you next year what effect the obtundent has had on my teeth.

Of this obtundent Dr. Taft says: "It was my privilege about a month ago to spend three days with Dr. Herbst and witness his methods. In regard to this obtundent, I will say that it impressed me as a questionable preparation when my attention was first called to it. Immediately on returning home I had the preparation made. It consists of sulphuric acid saturated with cocaine; and in that experiment we found that one dram of sulphuric acid dissolved thirty grains of crystals of cocaine; then add about one-fourth of a dram of sulphuric ether. The amount of sulphuric ether applied is not important, enough simply to saturate the solution. I have used it in quite a number of cases, and in every instance, unlike most other obtundents with which I am familiar, it has been successful. Whether that was owing to the properties of the material or was the accident of peculiar cases during this time perhaps may be a question, but my impression is that it is of the most general efficiency of any obtundent I have ever used. The action is simply that of the sulphuric acid on the dentine, dissolving a portion of it, but is superficially escharotic on the living tissue. The influence of the cocaine is to obtund, as Dr. Bödecker has said, the sensitiveness caused by the action of the sulphuric acid. The ether is, as I conceive, for the same purpose, simply to relieve the point that would be given by the application of the sulphuric acid alone. After the application, the cavity having been dried, the decomposed bone appears on the walls of the cavity.

Permanganate of Potassa is one of the most powerful disinfectants known. It has the extraordinary power in destroying fetid odors from organic sources, and poisonous emanations from gangrenous ulcers, abscesses, and wounds of all kinds. As an oxidizer it is not second to peroxide of hydrogen. It is soluble in treatment of deep seated ulceration, caries of the bone and necrosis.—*Ingersoll's Dental Science.*

THE HERBST METHOD.

DR. C. F. W. BÖDECKER, NEW YORK.

I think there is an advantage in this method. In the first place, I claim that the adaptation of gold against the walls of the cavity is better than can be obtained by any other method that I have ever seen. I have proved this in New York at a clinic to the satisfaction of every one that saw it, as well as by experiments which I have made in my own house, and those together with Dr. Herbst two or three years ago. That is one of the greatest advantages. The adaptation of the gold to the walls of the cavity, I think, saves the teeth in every instance. If you take a piece of gold and hammer it against a smooth surface (it does not make any difference whether you take steel, glass, or any other hard substance), and afterward subject it to examination under a microscope, you will find the adaptation to that wall is imperfect. On the contrary, if you take a piece of soft gold, and pack it against the same surfaces by a rotating instrument in the engine, and then examine the surface under the microscope, you will see that you have an absolute fit to the wall of the cavity. For this purpose a piece of glass will show you better than anything else. You can take a pretty thin piece of glass tubing, rotate a piece of gold against the walls and examine with a microscope and you will see that its adaptation is perfect. You can take the glass tube and put it into a solution of carmine or aniline, and you will not be able to get any discoloration between the gold and the glass; but with malleted plugs, however carefully made, a very thin solution of aniline will percolate through.

That is one of the great advantages, I think, of this method.

In a certain class of cavities, at least one-half of the time will be saved. Those are cavities in the proximal surfaces of the molars and bicuspids. Every one knows that such cavities, sometimes extending under the gum, are exceedingly difficult and tedious to manipulate. By this method, as a general rule, the most difficult operations with which we have to deal are rendered the simplest; but the uppermost portions of the cavities, or the last layers in the grinding surfaces, are somewhat difficult to adjust. Therefore I have advocated adapting the last layers with the mallet. I think the result will be better, and it will be very much easier for those who are accustomed to that method. Another great advantage is that the patient who has had teeth filled by this method will certainly ask you to use it in preference to the mallet. I have had several operations performed in my own mouth, and all those who are present who have experienced both methods will bear me out in saying that the Herbst method is a very great improvement, as far as the patients are concerned.

HERBST'S METHOD.

FROM THE PATIENT'S STANDPOINT.

[In American Dental Asssociation.]

Dr. Marshall: I happened to be a patient of Dr. Herbst during his clinics here, and perhaps some of you would like to know how the patient feels under the rotatory system of plugging with gold. I can only speak from the patient's standpoint. First, let me say, I prefer in my own mouth the method of Dr. Herbst to the mallet. It is certainly much more pleasant, and I did not suffer one-half what I have done by the use of the mallet. He plugged for me two teeth, a crown cavity in the left inferior second molar, and a compound cavity (distal and grinding surfaces) in the left inferior second bicuspid.

The amount of pressure which he used in packing the gold was considerable, about the same as used in packing cylinders by hand-pressure. I found that after a little while my jaws became very tired from the heavy pressure which he used, and I was obliged to support my chin during the remainder of the operation. The motion which he used in packing the gold was peculiar,—viz.: heavy pressure and a drawing motion toward the walls of the cavity. This produced an unpleasant sensation whenever the instrument came up against the walls of the cavity. I thought sometimes the wall had been broken, but those who were watching the operation told me this was not so. Aside from this, I can say nothing, because I did not see the operation.

Dr. Atkinson: When Dr. Bödecker first introduced this method, he wrote to me saying that he had witnessed a method of filling teeth that had captivated him, and that he was sure it would me. The affection that I bear Dr. Bödecker made me almost assent to it by letter. But having been so thoroughly indoctrinated in my own experience in the use of the mallet and heavy gold, and thinking that I did not need anything else to make the best possible fillings, I said, now go slow; and it took me from the time I got his letter till since the arrival of Dr. Herbst to really comprehend the process.

I have witnessed sixteen clinics, four of which I was able to see from the beginning all the way through, and one of which was in my own mouth, so that I understand it at both ends, and I give it my adhesion, stubborn as you say I am, bull-headed, and wedded to my own methods, which are not my methods, but those that are given to me from higher sources.

I tell you I have a new revelation. For hardness of surface I know of no method that touches the rotary method as a surface-finishing method. I have tested fillings made by it with files to my own satisfaction, and know that they are the hardest that I have ever seen packed. When he was in my office my son suggested to him that he might try his method

on No. 120 rolled gold. He tried it and succeeded beautifully, and adapted it to the wall of a tooth in the jaw of a skeleton they had at hand. My son said to him, "We have what father is in the habit of using for teeth where much wear comes on them, platinum iridium and gold," and he used that and succeeded with it. Those who try it at first and don't succeed must not be discouraged, but go to some one who has been indoctrinated in the method, and, as Professor Taft has properly said, they will catch many little points in observing the combined process of rotation and of pressure at the same time. The rotary movement, I had supposed, would be so rapid as to cause elimination of heat and be a source of inconvenience and discomfort to the patient on that account, but that is avoided by a peculiar twist of the wrist, thumb and forefinger, so eminently possessed by Dr. Herbst, and by the slowness of the motion, and direct shock is not produced. I think any one who has been accustomed to filling teeth by hand-pressure alone can by a little education direct the same genius and energy into packing the gold toward the wall. I felt the same that was expressed by Dr. Marshall, the instrument would slip a little, especially when he was using the agate point; but let me say to you, try it till you comprehend it, and then I prophesy you will not abandon it.

Dr. Marshall: Dr. Atkinson spoke of friction and the production of heat. In the filling of the cavity in the bicuspid I experienced nothing of that kind. In the filling of the molar I did. Gentlemen were frequently examining the progress of the operation, and by some mishap the filling from moisture lost its cohesive property, and several gentlemen said that it would have to come out. Instead of that Dr. Herbst took a steel instrument and with heavy pressure and fast rotation he produced considerable heat, so that it pained for a moment pretty sharply. He then annealed a piece of gold and put it on that point, and it cohered at once, and he went on and finished the filling.

I will allude to a few of the principal points of the Herbst method, which I understand have been misapprehended. One of the principal advantages in filling by the Herbst method is that every complicated cavity is converted into a simple one with four walls, by the use of matrices. With reference to the manner of the introduction of the gold, the cavity is prepared in the usual manner, just as you would prepare it for any other method, and shaped without any sharp undercuts. If the general shape is sufficient to hold the filling, it is all that is necessary. When the cavity is prepared and the proper matrix is applied, you take a few large cylinders of gold, say for an ordinary cavity of a bicuspid from three to five large cylinders, and introduce them with a hand plugger like Herbst's hand instrument, as large as the opening of the cavity will permit, with which while rotating it in the hand the gold

should be pressed down into the bottom of the cavity. If the gold lies quiet it is all right, and you proceed with the engine burnisher to burnish it down tightly. If the cavity is very large or shallow so that there is but little undercut, and you do not like to make any, cover the first layer of gold with a piece of cotton, using the rotating burnisher on the cotton to condense the gold beneath it. When this is done the cotton is to be removed and the gold further condensed by means of the rotating burnisher used in the engine directly on the gold. The cotton is held by another instrument or a finger so that it does not revolve, and the rotating instrument is pressed on it with a great deal of force, moving over the whole surface of the gold. Then take a large agate instrument, when the cavity will admit it, and with this press very tightly against the gold, running the engine not too fast, and at the same time moving or rubbing it from side to side. When this has been done an exploring instrument is made use of which has a very fine point, and with this every portion of the surface of the gold is to be examined. This instrument will show exactly every place that is not perfectly condensed, and wherever the instrument sinks into the gold this has to be recondensed by a finer rotating instrument, either steel or agate, in the engine. When the condensation is complete, it is much better to roughen the surface of the gold, and this is done very nicely with an old excavator which has been broken at the point. Dr. Herbst uses this for two purposes, namely, as an exploring instrument, and at the same time to roughen the surface so as to make the next layer of gold cohere. This can be done as well by using the steel rotary instruments in the engine. If steel is employed, this roughening of the surface by means of the broken excavator is unnecessary. When this has been accomplished the next layer of gold can be put into the cavity, and so on till the operation is complete. In the last layer it is very much better to use heavier numbers, as the thin numbers (Nos. 4 to 10) of foil, as a general rule, will not produce as good a surface as heavy foil (Nos. 20 to 60). I called Dr. Herbst's attention to that last year when I saw some of his fillings which had become a little rough on the grinding surfaces. But these fillings were smooth at the proximal surfaces. Some of these fillings had been in the mouth two, three, or four years. At first, Dr. Herbst thought he could not use heavy foil with his method, but he experimented and found that he could use No. 10 very well. He did not go any further at that time, but since he has been in this country I asked him to use No. 30, which he did, and since that time he uses that number on all grinding surfaces. Before using No. 30 the surface ought to be made rough, either by a rotating instrument, a hand plugger, or a broken excavator. I have heard some gentlemen say that the Herbst method was nothing else but hand-pressure. But this is only used to

put the gold into the proper place where it is wanted. The condensation is effected by means of an agate or a steel instrument in the engine. In the last layer, when applicable, Dr. Herbst makes use of a garnet, which was originated only three weeks previous to his departure from Europe.

It is surprising how hard the surface of the gold gets. The surface of the gold becomes so hard thut the ordinary corundum stone sometimes refuses to take hold of it in finishing it off.

Gold and Silver Solders.—The process of formulating and compounding an alloy with which to form gold and silver solders, develops what seems to be a fact, that pure zinc—*i. e.*, free from arsenic, antimony, cadmium, etc., will not render gold brittle.

Take of chemically pure metals, silver, one part; zinc, two parts; copper, three parts.

Melt the copper in a clean borax-lined crucible, add the silver, then the zinc in small portions, with constant stirring with a clay rod.

When the denser fumes of the burning zinc pass off, pour from a height into water, or pour into an ingot mold. The resulting "solder alloy" may be used in the place of the metals usually employed in connection with gold and silver for gold and silver solders, with the following results: The solder will follow and retain the color of the plate used, and will be tough and free from brittleness.

The usual method of employing this alloy is to take from four down to two parts of either gold or silver (as gold or silver solder is desired) to one of the alloy, melting together under borax with agitation, rolling to the desired thickness, and marking on one end the carat of the gold used (if gold) and also the proportion of gold, as for instance $\frac{20}{3}$ ($\frac{20 \text{ carat gold}}{3 \text{ parts gold}}$). The solder formed by the use of this alloy is easily made, easy flowing, and as strong as the plate from which it was made.

Veratria has been of very great assistance to me in obtunding sensitive dentine. A certain amount—about a grain—of veratria will dissolve in about three drops of alcohol. To that put sufficient tannin to saturate it, and then add ten drops of glycerin. It will of course be understood that this remedy must be applied when the dam is in place and the teeth perfectly dry, as it is exceedingly poisonous. One-fiftieth of a grain is a dose. After being in the tooth ten minutes I wash the cavity with alcohol, dry it thoroughly, and find I am able to excavate with little pain. E. A. BOGUE, New York.

IMPLANTATION.

DR. W. H. ATKINSON, NEW YORK.

Last Saturday I was invited to Dr. Woodward's office, where three patients were expected for the exhibition of this process of implantation. Dr. Younger was a little tardy, and Dr. Woodward asked me if I could not do something. I looked around and saw a dozen real ripe minds, and I said wherever you can get as many American dentists together as there are here they can do anything that any human being can do if they will pool their issues. We had to use such instruments as we found at hand; but though it was the first time I had ever performed the operation, the superior central implanted did not need any ligature, the adaptation being so complete that we drove it in, and it seemed firm at once.

Whenever any man brings us anything we do not tell him he is a fool, and that what he claims is impossible. We say, "Let us see." So, as I said when I first heard of Dr. Younger's method, give him free opportunity to get his case before the court and do not prejudge it.

Of this case Dr. Dwinelle says: One word in supplementing what Dr. Atkinson has said. I think it would be interesting to have the case operated on by Dr. Atkinson more clearly stated. The young man had a left central incisor broken off, the root remaining in position, with a large ulcer on its extremity. The tooth to be inserted had a much larger root than the one Dr. Atkinson extracted; but nevertheless he went forward boldly, as he always does when he knows he is in the right. He introduced a drill, reamers, burs, etc., and enlarged the socket to an extent that must have eradicated every vestige of the walls of the ulcerated and dead socket. He inserted the tooth in a very handsome manner,—so much so that Dr. Younger had better look out for his laurels, to say the least. I saw the operation two days afterward, and so far it was very successful. The interesting part of the operation was, that he reamed out the ulcerated socket, removed the diseased parts, and introduced a much larger root than the one removed. It is in good order, I understand, to-day.—*Cosmos*.

Order and Decorum in our Society Meetings.—The advice of Dr. Barrett to the last Am. Den. Asso'n in his annual address may well be taken by other societies. It is as follows:

It would be well for us if we should more carefully consider the amenities of debate. There has at times been a lack of the decorum which should be observed, and speakers have too often engaged in personal discussion. Nor is it respectful when a member has been at

much pains to prepare and come a long distance to read a paper, if he is not listened to with attention. No greater indignity could be offered an essayist at such times than to engage in whispered or loud conversation or in moving about and manifesting impatience.

It is one of the most important rules of such assemblages as this that every one in speaking should address the chair. He is supposed to be talking only to the chair, and remarks addressed by him to other members or by any of his audience to him are entirely out of order. May I not ask your assistance in insisting that whenever a question is to be asked or an answer given it be addressed to the chairman? In this way all acrimonious personal controversies will be avoided, good order maintained, and debate greatly facilitated.

I also ask your hearty coöperation in preventing unnecessary moving about during the debates, in suppressing needless private conversation, and in banishing from our sessions everything that shall in any way interfere with the manifest objects of our meeting. In this way, and in this way only, shall we make of this a successful meeting and at the end have the satisfaction of knowing that we have materially advanced the cause we each have at heart.

The Physician and Chloroform.—I had a physician once bring his patient into the office, and she through his advice, I think, objected to the inhalation of the gas, for which I was prepared, and proposed to take ether or chloroform. He, being a physician, preferred chloroform. I had administered chloroform combined with sulphuric ether, and I thought that was a little safer, and so I modified his practice and had him put a little ether with his chloroform. He got the lady under the influence of it, and I was to do the extracting. He said, "Doctor, now we are ready." As I stept up to commence the operation, I said, "Doctor, she don't breathe." "So she don't," he said, and he ript open her dress and proceeded to induce respiration artificially. Meanwhile I was studying the patient's physiognomy, and I concluded that there must be some other reason that she did not breathe besides what appeared on the surface. So I pulled the corner of her mouth down and saw that her tongue had fallen back, covering the glottis completely. I took a burnisher and pulled her tongue forward, and she commenced to breathe right away. That incident frightened me. I came mighty near, through the ignorance of an M. D., who was to take all the responsibility in the matter, having a patient die in my office. It was nearer than I ever came to it alone, and I said, the next physician who gets into my office to do anything of that sort will be wide awake and up early in the morning. I should feel worse to

have a patient die that way than I would if *I* had killed the patient, for then I should be busy, but to stand by and see her murdered was something dreadful. It is all very well for a physician to say that he takes all the responsibility, but the fact remains that a certain amount of responsiblity always rests on the man who permits the administration of these things in his office, and either assists in, or in part is supposed to benefit by or participate in any profit which may be the result of their joint action. It is, to all intents and purposes, a limited partnership, and in all such connections all the parties thereto participate in the profits, and as a consequence, must share the losses.

A. J. WATSON.

Too Much Drilling.—I am sure many teeth are ruined by too much drilling. First, in dead teeth, or those that have to be devitalized and pulps removed, drill only a small drill hole in direct line of the pulp (this o size).

Always in crowns of molars and bicuspids, palatal side and canines and incisors, drill in direct line of pulp chamber, but never drill into the canal. There is where the trouble begins, if the root is curved, you will drill through the side; if molars and teeth that have more than one root, you will go between the roots to the alveoli and weaken and ruin the tooth. Even in a tooth of many cavities, if there is not one in direct line of pulp, make one, and stop as soon as you get to the pulp chamber, and only enlarge with a small bur so that you can get your brooch in all the roots.

Second, many times, two or more cavities are cut together, often weakening the tooth. Great care should be taken to preserve all the enamel possible to secure strength. J. S. MARSH.

Danger of the Long Continuance of Gas.—A statement has been made that you could not give the gas for a long time. I have given it for a long time; so you can. In one case I gave some gas and extracted a tooth, and I kept on giving gas till I had extracted thirty-two teeth from that one mouth, inside of, I should say, two and a half hours. The only thing that saved my patient, and me from committing a murder, was the fact that once in a while the patient would gasp, and I would stop giving the gas and give her a chance to get some breath. Consequently, I live to tell the tale, though under those circumstances, I ought to have been hanged for my ignorance. I have come to the conclusion that you not only run the risk of killing your patients, but supposing you do not go so far as that, and the patients live, you produce on their systems an effect from which they do not recover in a few minutes. DR. ODELL.

CERVICAL DECAY AND THE MALLET.

PROF. JAMES TRUMAN, PHILADELPHIA, PA.

The cause of cervical decay has not been explained by any of the theories extant. During the period previous to the introduction of the mallet, decay of the cervical border was not a permanent feature. This immunity from decay continued after the introduction of cohesive foil and contour work, with hand pressure. This freedom from destructive influences could only be ascribed to one cause, that of the use of hand pressure, without sudden impact and the jar and fracture of the tissue. Microscopical examinations long ago demonstrated that cracks are found, generally in enamel, doubtless produced by occlusion and extremes of temperature. Cracks are common in the labial surfaces of teeth and visible to the unaided eye; but these have no pathological significance. The very minute cracks in other portions, more extensively bathed with acid products, are rapidly affected by imbibation of these fluids and the result is caries. As the cervical border is not as much exposed to fracture as other portions, the inference is that under earlier methods of practice they were not a prominent factor in this destruction. On the introduction of the mallet, however, this is changed, and it is found impossible to avoid, with any degree of certainty, destructive disturbance at that border. My explanation is, that the sudden impact of the mallet produces fractures in the enamel and subjacent tissues, and these, by imbibition of the oral fluids and subsequent fermentation establishes caries. In proportion to the force used is this increased; hence electric mallets and power mallets of all descriptions would have a destructive result. The remedy for this is in a return to hand pressure, and possibly to rotation, as explained by Dr. Herbst, or what I regard as better, a modification of his method combining hand pressure, with sharply serrated instruments and the rotating force.

Bad breath.—The general conclusions arrived at in the discussion of this subject in the January meeting of the Odontological Society of Chicago is, First: That decaying particles in the mouth as far back as the vault of the pharynx had little or nothing to do with tainting the breath as it is exhaled. Second: Mouth breathers have a bad breath when the tonsils are enlarged, inflamed, or when cheesy masses are found in the folds of their mucous covering. Third: That certain forms of gastric derangement taint the breath only when gases are eructated through the mouth. Fourth: The principal cause of bad breath arises from decomposition in the intestinal canal below the stomach, the retention of fecal matters in the traverse and descending

colon, and the absorption of gases thence into the circulation, which are finally exhaled by the lungs. Fifth: Nasal, pharyngeal, laryngeal or bronchial catarrh is a cause of bad breath. Sixth: The administrations or the use of aliments which undergo chemical changes after passing the esophagus may by their rapid absorption through the walls of the stomach, or immediately below it, contaminate the breath by giving to it the characteristic odor. Seventh: The dentist may here find a field for study in discovering the ultimate causes of bad breath and pointing out the correct treatment or the prophylaxis. The general opinion of the members of the society seemed to be against the theory that decayed teeth, inflamed or ulcerated gums, the influence of micro-organisms or other local causes, had much to do in producing bad smells, excepting only those cases wherein the patient habitually breathes through the mouth. We incline to the belief that the members were right, and further believe that a proper study of the causes of bad breath, which is of great importance both to the dentist and his patient, will involve an investigation of the alimentary tract below or beginning at the stomach in order to solve this problem.—*Dental Review.*

How to use Gold in Filling Teeth.—While the knowledge of the cohesive quality of gold is widespread and appreciated, it is not thoroughly understood nor thoroughly trusted. We want to realize, to get the benefit of the cohesive quality of gold, all that is necessary is to bring the surfaces in contact with force enough to break down the angles. There is no need of hammering the life out of it. I want to express my gratification to Dr. Herbst for his process. I understand the method to be, in a few words, the application of the rotary motion to condense the gold. I do not believe any other man ever thought of it or applied it till he suggested it. I want also to express my gratification at seeing a man so thoroughly dextrous, so ingenious and original. There are many of us who will have in many respects to take a little lower seat as operators than he deserves to occupy. I am sure I have derived much benefit from what I have learned of his method, and, as Dr. Truman has said, I am going to try it thoroughly. I am sure there is much in it that I shall be able to apply in connection with my own method of operating.

Portland, Me. T. FILLEBROWN.

What is "sulphurated hydrogen" Dr. Rishel alludes to in March ITEMS? Can it be possible he means "sulphuretted hydrogen?" Has he any warrant for his new name? I am in darkness and wish enlightenment.

Canton, Ill. J. W. PECK.

TAKING COLD.

A WAR EXPERIENCE.

[Appropos to our article on this subject of last month the following is in point. The fact is, consumption and kindred disease are "house diseases." Those who are much out doors and in vigorous exercise are generally free from them.—ED. ITEMS.]

Let me relate my experience. I served three years in the 13th Mass. Regt. I was a delicate young man with a consumptive tendency. When our regiment was on its way to the front, our captain singled out, as I subsequently learned, two men (robust, hearty fellows) whom he thought would survive the hardships of war, and two more (I was one of them) who would not do so. As it happened, both the hearty fellows succumbed to the hardships of the service and died—and I live. The fourth man was taken down with chronic diarrhea, and died on the way home. Naturally enough, sleeping on the damp ground soon brought on a cough. I was sent to the hospital; subsequently returned to the regiment, still sick, and spent the winter with it in close board huts, at Williamsport, Md. I was excused from all duty, except to turn out at the evening dress parade. My officers wanted me to accept a discharge and go home; had I done so I verily believe I should have died. When our army, in obedience to Lincoln's orders, moved across the Potomac in the early spring of 1862, I was left behind as too weak to "keep up with the procession." A little squad of us feeble ones followed, as best we could, in the wake of the forces, sleeping at night in sheds, under hay stacks, or wherever and however night found us. Singularly enough, with each day of "roughing it" I gathered new strength, and within a week I was able to take my place in the ranks, and from that time forth I *couldn't* take cold, no matter now much I was chilled, or soaked, or frozen. I have often thought of it since, and believe that if one spends *all* his time in the open air, he cannot catch cold; it is alternate indoor and out that makes all the trouble. The second winter we spent half burrowed in the sands of Stafford county, Va., with shelter-tent roofs to our "dugouts." The third winter, at Mitchell's Station, we lived in diminutive log huts with the same kind of roofs. In both cases the ventilation was perfect. I remember entering one day an ordinary house, and the sense of suffocation was so great that I could not stay there. Arctic explorers, I believe, relate the same experience. My advice, therefore, to those consumptively inclined, is to go out to the woods and plains, and live "near to nature's heart," if they wish a radical cure.

Dorchester, Mass., February 19, 1887. B. SPOONER.

Misfits and Broken Blocks.—Dr. Rishel says "for vulcanizing at 335 degrees of heat, then suddenly plunging the vulcanizer in cold water is a sure way of producing misfits and broken blocks." My experience shows otherwise. I have heated blocks of teeth over an alcohol flame till they showed a red tinge and then plunged them immediately into cold water and they showed no change, and resisted force as well as those not so treated. On a second heating they showed a few seams and scars which disappeared after a second cooling. The blocks were a LITTLE weaker than before. Repeated terms of heat and cold made no change. Now does any sane man suppose that 320° will produce this result in a bed of wet plaster where the moisture acts as a friendly agent to preserve the texture of the gum? I venture the opinion that dry heat MAY do ill but not wet heat. I almost invariably cool my vulcanizer in cold water but am careful not to take the plate out of the plaster till cold. I believe most poorly fitting plates result from a defective impression or taking the plate from the plaster while hot, or at least warm, and thus springing it. And I believe broken gums result invariably from too much pressure and a super-abundance of rubber. Such is the case in my hands. The plaster will not bend; the flask will not give; the pressure is inexorable, and hence the gums must give. This is the only virtue I can see in his flask and vulcanizer arrangement—it puts on the pressure when the rubber is in the best condition to be pressed. I have little trouble with ill-fitting plates in my practice and scarcely any with broken gums. I think it is because I try to be careful.

Canton, Ill. J. W. PECK.

Dr. Knapp's Bridge-work.—Dr. W. B. Ames, Chairman of Section I, on Mechanical Appliances in the last American Dental Association, thus compliments Dr. Knapp's method: Section I desires to make a supplementary report so to make prominent mention of the processes and appliances of Dr. J. Rollo Knapp, of New Orleans, which have been shown to the members in his various clinics during the past two days.

We consider that in perfection of detail and in the consummation of really artistic effects, his methods of constructing crowns and bridge-work are worthy of this mention. Instead of stereotyped results in which there can be but little individuality or taste displayed, his methods produce by simple yet exact stages porcelain faced or all-gold crowns that will admit of very little criticism if the processes which he advocates are imitated by the skilful and careful manipulator.

His very unique and original blow-pipe, with which he utilizes the compressed nitrous oxide gas in connection with illuminating gas to

produce what is practically an oxy-hydrogen flame, promises to be one of the most useful appliances ever offered for dental laboratory use. We are glad to announce that we are soon to be able to procure the apparatus from the manufacturers.

A Requisite to Success in Practice.—We have most of us seen the singular spectacle of a dentist of only ordinary skill, perhaps even a bungler, overrun with patronage. Such men are unusually good talkers, discreet, and users of admirable tact. It is not by any means a loss of time to give ten or fifteen minutes to answering inquiries, making suggestions, and so preparing the way for a "full sweep" when the time for active operations arrives. A succesful dentist whose field was not a large one, once explained to an inquirer that he usually calculated on doubling his bill by doing two-thirds of the work with his tongue. He was a fine dentist and the imputation of dishonesty could hardly be laid at his door. A legitimate field for the exercise of this peculiar kind of diplomacy offers when people present themselves wearing diamonds and fine apparel, with a predisposition in favor of cheap dental operations.—*Medical & Dental Journal.*

Standard of the Dental Faculties Association.—The following resolution, offered by Prof. Abbott, after discussion was adopted:

Resolved, That dental schools which do not conform to the regulations of this Association shall not be recognized by the association, and that the National Association of Dental Examiners be requested to take action in reference to such schools.

Prof. Abbott offered the following resolution, which was adopted:

Resolved, That a standing committee on schools be elected, whose duty it shall be to ascertain, as far as practicable, the workings of all dental schools in this country and Europe, and be required to furnish information to the Dean or Secretary of any college, when desired, and to report in writing at each meeting of this Association.

The following committee was elected: Professors Abbott, Guilford, Ingersoll, Winder and Fillebrown

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Durability of Oxyphosphate.—Dr. A. G. Bennett, in the *American System of Dentistry*, says: The durability of fillings of this compound is sometimes surprising. Under favorable conditions, a filling made of the best quality will usually last two or three years; and some fillings have been known to last from five to seven, and even ten years. In the mouths of foreign students, I have seen filling of German cement in crown cavities, that after eight years' wear were but slightly cupped in the center. Gold would have done no better, and amalgum could not have made as presentable an appearance.

REPLANTATION.

Eleven years ago two patients came to me with abcessed right-superior-lateral incisors. In both, the teeth had been filled with gold for several years. After repeated sittings, the patients and I became discouraged. I then extracted and replanted thus: Cutting about a sixteenth of an inch off the root, I filled the pulp canal with gold, after thorough cleaning and disinfecting. I then washed the tooth cavity with carbolized water, and immediately replaced the tooth, and tied to the adjoining teeth with floss silk. There was some pain for about four days; on the tenth day the silk was removed and the teeth pronounced all right, and have so remained to this day. One of the patients was a physician aged 47, the other my wife.

St. Paul, Minn. A. J. THOMPSON.

Movable Bridge-work.—Dr. J. A. Swasey has shown a method of adapting a removable bridge, or, more properly, small removable plates. By this method a continuous band is adjusted, usually to the tooth posterior to the space to be filled, and a small, narrow plate struck up to fit the ridge, which is soldered to the band, with teeth properly adjusted and articulated attached thereto by solder.

The advantage claimed for the process is the great superiority as to stability of the continuous band over the open clasp, which, if accurately fitted, need not be cemented in place to give this stability. The band should not be made to pass *beyond* the largest circumference of the tooth, thus being kept from the gum and preventing all friction and wear. It should fit as snugly as is practicable. Dr. Swasey has constructed numerous appliances of this kind, and with much satisfaction to himself and patients.—*American Dental Association.*

Berlin papers copy from the *Germania* the account of an important discovery in glass manufacture made by Friedrich Siemens, of Dresden. He has succeeded in casting glass in the same way that metal is cast, and obtaining an article corresponding to cast metal. The cast glass is hard, not dearer in production than cast iron, and has the advantage of transparency, so that all flaws can be detected before it is applied to practical use. It will be much less exposed to injury from atmospheric influences than iron. The process of production is not difficult, the chief feature being rapid cooling. The hardness and resisting power of this cast glass are so great that experiments are being just now carried out at the Siemens Glass Foundry at Dresden with the purpose of ascertaining whether the material could be employed for ties on railways.

For Our Patients.

EDUCATED ENDURANCE.

The philosophy of pain is one of the first lessons which should be taught a child. To suffer, as well as to enjoy, is a portion of the inevitable destiny of every human being. Our mental and physical structure is such, that the capacity to enjoy presupposes the liability to suffer. Neither fortune nor friendship, sympathy nor love, can wholly ward off the approaches of evil There are no human or divine protections which can entirely withhold the chalice of suffering from a sensitive and perishable organization.

The child cannot too soon be taught this important lesson. Loving our children so much, we are prone to leave them in ignorance, when ignorance is *not* bliss. Pain is sometimes fearfully intermixed with their earliest experience of life. It is something to which they are at all times exposed, and from which an escape is impossible. Generally, all the teachings they receive in relation to this subject are positively hurtful. There is no industry spared in inspiring them with a fear of the fire, and deep waters, and chilling winds, and drenching rains. All the moral machinery which can possibly frighten a child into a decent observance of the commonest laws of health, is incessantly plied—worked, so to speak, with a "forty horse power;" but when pain comes—when the dear little fellow, in his own person, must grapple with suffering, then he is taught by implication, by example, by words even, to dread and not to endure, to weakly shrink from rather than to endure what is necessary for his good. If any benefit were attained by this training, it might be regarded as at least partially excusable, but so far from this, it almost invariably produces a degree of morbid or spasmodic nervousness which serves only to prolong and intensify the suffering, which is contemplated with so much fear.

Witness, for instance, what every dentist is often compelled to witness, the conduct of a child brought into the office for extraction of a tooth. We have seen children face this melancholy music without dread, and exhibit a bravery which, in after years, might acquit them favorably on a field of battle, or in scenes of the most trying experience. But unfortunately, these miniature generals and heroines are exceptions to the rule. The majority approach the ordeal with ill grace, and sometimes with an ugliness of feeling and manner anything but complimentary to the sweetness of human temper; and the scenes which follow leave an unpleasant impress on the memories for life.

All that is disagreeable in these occurrences might be easily avoided. The instinct to shun pain is natural, and commendable enough in its place. But it should be directed into its proper channels, and trained to its legitimate uses. To a greater extent than they seem to imagine, parents are plainly responsible for the behavior of their children while under the experience of necessary suffering. We fear they have but imperfectly performed their most sacred duties, if they have neglected to teach those looking to them for instruction and example, to bear the trials of their young life with patience and fortitude. The beauty and usefulness of the processes of nature for the development of the physical being can be readily explained to them, and they can be easily so educated to endure pain as to look on it without apprehension, and submit to it without dread. We can think of no quality but moral goodness, which would be more beneficial to them in after years.

An entreaty for compassion for the dentist would probably seem highly ludicrous; but a compassion which would less frequently place him in the character of a slaughterer of the Innocents, would be as gratifying to him as it would be fortunate for the rising generation. —T. B. A., in *Allport's Dental Journal.*

TIT FOR TAT.

A FABLE—BY AN OFFICE BOY.

One Day a Man cum into the Bosses Offis, and says he, mister, I am A Stranger which cum A hundred 50 Miles To Get some Teeth filled; can you do it right Away? the Boss he Thot a Minit and says he, No I'm afeard Not; I've got A all-Day appointment With judge perkinsis Wife. so the Man went of, and after a While the Boss he Got tired Waiting for miss perkins to cum, so he went and cleaned out the Seller, and Shuveled Cole all day. Late that Evnin Dr. Jones cum in Smokin a 15 sent sigar, and he Slapt the Boss on the Shoulder, and says he, hello, sanders, you dun me A good turn Wen you Sent that Stranger over To my Offis this a. m. I Dun Forty-4 dolers an' 50c. worth Spot Cash fur him. The Boss looked Kind o' dazed Fur a Minit, and after a Bit he remarked That he be Dam if he Ever had A bit of Luck. One day About a Weak later mis perkins cum sailing in Just as Me an the boss was tryin' to put a Clamp on a wisdum Tooth in a Sucker's mouth, and Says she, doctor, I'm Ol Reddy; Kin you Wait on me rite Away? I Seen he was Mad, but he Smild kind o' Pleasant, an' says He, cum in After diner an' Yu'll find The chair unoccupied. she Went of, Lookin' like she Thot that Wasn't the way She was Expectin' to be Treated. After diner she Cum in an' says kind o' commandin'; Wher's The dentist? an' says I he's gone Fishin.' Gone Fishin! says

she turnin' red. Yes, says I; he'll be back 'bout crismus. Says she, you Tell him i've Gone to Another dentist wot's More puntchul. He'll never Do no more Work fur Our family. So There!

[This fable teaches that when you are not quite certain about the temper of your metal, it is not a bad plan to keep several irons in the fire.]—*Med. & Den. Journal.*

Don't Extract Teeth.—Do not get panicky and imagine the Almighty will not grow jaw enough to accommodate the teeth if they are large. It is an indication the individual will be large and the jaws should not be interrupted in their growth.—*M. in Archives.*

FORTITUDE FOR NECESSARY PAIN.

Not willing to endure the pains of life?—
Not willing to endure the needed strife
Twixt wasting tissue and the surgeon's knife?
Thus sparing torture brings a sure decay;
And suffering torture is the only way
From pain's dark night to ease of joyous day.

What folly! Be courageous! Bear the pain!
Submit with grace to necessary strain
Of nerve and feeling, knowing well the stain
Of cowardice has nothing noble. Stand!
And though it takes the life, put forth the hand
Into the fire, if good or right demand.

These babies overgrown are worse than those
In mother's arms; they look for fright and woes
And tortures, where only thorns of sweetest rose
Are found: just nothing to endure, yet bringing
Perfume and zephyr's softest whisper, singing
Well done! With bells of triumph ringing.

Stand firm then; strong of will to meet the ills
Of life! For nothing in this world so thrills
The soul with glowing ecstacy, and fills
The life with inspiration as—*I will!*
If you would know what strength it can instill,
Bare yourself to the hard'ning of its drill.

The child of ease and soft indulgence dies;
The child of hardship, brawn and toil denies
Himself; his self-controlling nerves despise
The shrinking from a necessary pain;
His prime demand is: Make my duty plain!—
Not, where is ease? But, where is life's true gain?

T. B. W.

Editorial.

THE SALIVA AND THE TEETH.

The British Journal of Dental Science gives the synopsis found in our October ITEMS of our editorial in last September on this subject, and then asks a question we should like to answer. To do so, perhaps it would be profitable to pass over again the general field of discussion, for it is one not frequently trodden by dental scientists. If we are right in our positions and deductions it is important that they be understood clearly. These were our statements:

"1st. Mineral acids do not produce decay; they only soften the fibers."

Dr. G. V. Black, one of the most intelligent and accurate dental observers in America, says: "Mineral acid will not produce caries; it must be a vegetable acid, and its ferment must be sugar or starch." Perhaps the distinction between mineral, vegetable, and animal acids has not been sufficiently observed.

"2d. There is nothing in measles or scarlet fever to destroy the teeth."

This statement would appear better if quoted in full, as in our September ITEMS: "There is nothing in measles or scarlet fever to destroy the teeth, though these and most other diseases so vitiate the secretions of the mouth as to invite fermentation of vegetable acids, and this fermentation may injure the teeth."

"3d. Acid dyspepsia is not usually the source of tooth decay." Let us add the full statement: "Acid dyspepsia is not usually the source of tooth decay. If the saliva is alkali or neutral, as it is in its normal condition, eructation of acid or acid gases will not produce caries."

"4th. Pregnancy does not produce caries."

This is hardly our position. Suppose we give our full text: "4th. What nonsense to suppose caries in pregnancy is caused by the demand of the fetus for bony constituents. There is no proof that lime is or can be abstracted from the teeth to supply the child; and if there was such an abstraction of lime from the teeth, it would not cause decay, but softening. It is the degeneration of the organic substance of the teeth that causes caries."

To elucidate our position that caries in pregnancy is not caused by the abstraction of lime from the teeth, we reminded our readers that

teeth are not bones; they are of the dermoid membrane. As well may we talk of abstracting bone from the hair, nails, or skin. There is lime in teeth, but by what process can this be dissolved out and carried into the circulation? Certainly not through the dental tubes to the pulp and thence through the dental veins; and it can not be by abstracting it from the surface of the teeth by the saliva, and thence through the stomach to the circulation; for, while healthy saliva admirably prepares food for digestion, it has no chemical properties to dissolve lime from the teeth. The idea that the saliva is a powerful solvent is correct, but the popular impression that it is an acid solvent is incorrect. It is neutral or alkaline, and it eminently protects the teeth by neutralizing and washing away the acids of fermentation or by making them harmless by chemical combinations.

At this juncture our esteemed contemporary asks, "Does not our friend forget that the saliva becomes acid in disease, and that its weak alkalinity is usually over-ridden by the acids produced in fermentation of food debris?"

It may become predominately acid or alkaline; but if acid, shall we be inconsistent in adding that the simple presence of acid does not decay teeth? It is not the over-riding of the alkali of the saliva by acid that causes decay. We often hear our patients say: "It is strange such a slight tinge of acidity we can not observe but by the test of litmus paper, should decay teeth." It is more than strange; it is absurd. Acid, to produce caries, 1st, must be exceedingly strong; 2d, it must come in immediate and uninterrupted contact with tooth; 3d, it must be in a nascent or forming state. But how can it become exceedingly strong, and not be immediately diluted by the saliva? By being protected in pockets inaccessable to the saliva. If fermenting materials are left between the teeth, or in their sulci (grooves, furrows, pits, cracks, etc.,) they become isolated, and work after their own sour will. The very process of fermentation throws around each fermenting particle a film, which, while it excludes the saliva, includes that on which it feeds. The bubbling in fermenting liquor is the gas thrown off in the bursting of these films. If these films isolated the ferment from the tooth as it does from the saliva it would do no harm; but the ferment has an affinity for both the lime and the organic or animal substance of the tooth, and therefore each ferment film incloses minute surfaces or particles of this structure. Then again, we sometimes speak of even a mild acid being destructive to teeth. Yet, if we put one in such a solution it is not affected. Why? You say it is not under the same conditions as a tooth in the mouth. But what are the differences of condition? O, it is not of the same uniform warmth. Then subject it to the same temperature; and yet it does not decay. But the saliva is

not there. Then put it there; yet it makes no difference. No, the fact is, it is not the *presence* of acid that decays the teeth, but its power in a *nascent* condition,—it must be in a forming, active, *working* state. The saliva may give the reaction to litmus paper of alkalinity in all parts of the mouth, and yet the teeth go rapidly to destruction. There are many instances where ammonia exists between the teeth, causing the formation, in immediate and protected contact with the teeth, of nitric acid, which, of all acids, is the most destructive to the teeth. Dr. Geo. Watts, editor of the Ohio *Dental Journal*, has proved this with great clearness, and Dr. J. Taft, editor of the *Dental Register*, remarks:

"Acids introduced into the mouth in food, drink, or otherwise, do not produce true decay; they merely cause a corrosion that is in no sense allied to true dental caries. The immediate or definite causes of dental caries are right on the spot and act immediately. The saliva contains alkaline materials, but there are other sources of origin. The expired breath contains a variable amount of ammonia. The fluids of the mouth, by absorbing this ammoniacal gas, of course, becomes alkaline in proportion to the amount absorbed. The test applied to the breath itself will demonstrate the presence of ammonia. When, then, this ammonia is oxidized in the mouth, nitric acid in its nascent state is developed, ready to act immediately."

Dr. Watt shows that this nitric acid may be still more destructively developed between the teeth by the presence there of ammonia.

A FEW DEFINITIONS IN PHYSIOLOGY.

Writers are not always clear in the use of the following terms:

A structure is substance arranged in definite form.

An organ is a structural body with the form and forces of an organized body for the spontaneous performance of some function.

An inorganic body may be arranged in definite form, but it has no definite organization or activities.

A function of an organ is the activities it is adapted to perform.

A tissue is a distinct part or form of an organized structure considered separately.

Anatomy treats of the structure of an animal or a vegetable body without reference to its life or functions.

Physiology treats of the origin, development, functions, and laws governing organized bodies.

Life is that principle and force inherent in organized bodies by which are formed their ultimate molecules, and through the power of which these primary centers are so united and developed as to produce a complex organism, and by which this organism is endowed with inherent functions, and a power to resist decomposition.

ABSCESSES AND ULCERATIONS OF TEETH.

There is much confusion in the use of these terms; and evidently this confusion is from an ignorance of their distinguishing characteristics; in fact the terms are used as synonymous, though the difference is great.

A text book used in one of our dental colleges has the following:

ALVEOLAR ABSCESS.

Give a definition of alveolar abscess.

Ans. A cavity containing pus, having its incipiency in the cancellated structure between the alveolar plates.

This is a better definition of an ulcer. Let us look at some of the characteristics distinguishing the two:

An abscess has life and growth; an ulcer is the embodiment of death,—it is sloughing disintegration of tissue. An abscess has a sac; an ulcer has no sac. An abscess is of the nature of an abnormal gland,—that is, it is an organized receptacle for the manufacturing of a fluid, its life depending on nerves, arteries and veins (those which formerly entered the pulp), and, like a gland, has a self-made canal leading to the surface for an outlet of the fluid manufactured; an ulcer is a bare, disorganized and disorganizing surface, throwing off disintegrated matter. An abscess has a fixt locality—always the apex of the root—and always indicates the death of the pulp of that root; an ulcer is generally on the side of the root, and does not indicate its death, but is often found there eating away the unprotected alveolus, and disintegrating the surface of the root, while the pulp of the root may be still alive, and the tooth not even carious. An abscess almost always (some say always, after full growth) has a fistulous opening, though sometimes so "blind" it cannot be found, if it has none it is sure to make one in time, and if it becomes closed it is not long before the pressure of its fluid forces an opening; an ulcer has never a fistulous opening proper, though if the ulcer is situated in deep seated muscles, or beneath them on the bone, it may have a circumscribed though not a fistulous opening. An abscess not only indicates the death of the pulp, but it is caused by it; an ulcer is caused by some irritating substance between the root and the alveolus, such as tartar, bits of bone, or hard food; it way be caused by hard blows or excessive pressure on a tooth, or twisting or moving it in dental operations, thus causing excessive irritation of the alveolus. An abscess may cause ulceration by irritation on the surrounding parts, so that we may have both an abscess and an ulceration, or it may terminate in ulceration when the abscess sac has been destroyed and its matter left as an irritant, though often this is taken up by the absorbent vessels and carried away into the circulation, thus leaving a normal condition.

The subject of our author's disquisition is an *alveolar* abscess. Is it not more properly a *dental* abscess that he has under consideration? For its attachment is on the tooth, not on the alveolus—its existence depends on the death of the pulp of the tooth, not on disease of the alveolus—its vitality and growth are sustained by the dental nerves and blood vessels that formerly entered the tooth, not by any supply from the alveolus. Its life is independant of the alveolus, does not depend on it or its condition in any way, and has no connection with it. Even though by its growth it so presses on the alveolus as to cause an absorption of a small portion of the alveolus, as the incoming of a tooth does, and though to make for the fluid it manufactures an outlet it bores through it, yet in both of these operations it is careful to protect the alveolus from injury by a strong membranous wall. Why then should we call it an *alveolar* abscess?

Our author continues:

What are the six causes given for alveolar abscess?

1st. Putrescent pulp.

2d. Tartar.

3d. Anecrosed tooth or root.

4th. Carious bone.

5th. Necrosed bone.

6th. Foreign materials, such as oyster shells, pieces of bone, coal, etc., from food; splinters, bristles from the tooth-brush, portions of filling material, protruding canal fillings, broken probes, etc.

"Tartar" may produce ulceration, but not an abscess. "Anecrosed tooth or root," "carious bone," and "necrosed bone" are not the causes of abscesses, but are *caused by* ulceration. "Pieces of oyster shell, coal, etc.," impringing between the neck or root of the tooth and the alveolus, do not cause abscess, but ulceration; so of the effects of splinters, etc.

In what condition are the parts placed by the removal of any one of the last five causes?

Ans. In a condition which permits a natural restoration to health.

The sloughing consequent in the irritation of these foreign substances is nature's effort to throw them out, and thus restore the part to a normal condition.

In what condition is a tooth left by the removal of the other cause? [Putrescent pulp.]

Ans. In such condition as, by *proper* treatment ("frequent stopping and unstopping," etc.,) to give reasonable hope for a longer or shorter period of comfort and usefulness.

Why?

Ans. Because "previous disease" constitutes a "predisposing cause" to the disease in the future; so that when an "exciting cause" is again applied, the parts being in only a *comparatively* normal condition, are easily disordered and irritated.

It is evident, this first cause, putrescent pulp, refers to an abscess, the other five causes to ulceration, thus showing the confusion in the author's mind between an abscess and an ulcer.

The idea that this abscess is to be cured by the removal of putrescent pulp shows ignorance. It is only one step in the process. In fact, it is evident from what our author considers a necessary expediency, "frequent stopping and unstopping, etc.," that he does not pretend to cure the abscess, but merely to give it vent. No wonder he significantly adds, "Previous disease constitutes a predisposing cause to the disease in the future; so that when an exciting cause is again applied, the parts being in only a *comparatively* normal condition, are easily disordered and irritated." But in fact, when an abscess is *cured*—that is, disintegrated and removed—it cannot return, for an essential to its life is the attachment it had to the apex of the root, as a terminus of the nerves and blood vessels that formerly entered the tooth; when this is dissolved, sloughing—death—of the abscess ensues. If this matter of dissolution is not cleansed away, it may, as we have said, produce ulceration; it *will*, if nature is not sufficient to remove it by absorption.

Fused Roots, Exostosis on Roots, and Attachment of two Teeth by Cement, are all of similar cause. Generally they are from irritation, but not necessarily so, nor always of late growth. They may be of simultaneous growth with the root. When a space in the socket occurs, it will be filled with either process bone or with cement thrown out on the surface of the root. This may occur during the formation of the root, or by the tooth partly leaving its socket through the loss of its occlusion. There may be an actual elongation of its roots by the growth of cement on and around its apex. A part or the whole of the root may be enlarged by an accumulation of this cement. Sometimes an irritant may produce a bulbous growth of cement on some part of the root.

The lacuni and the canalicuni of bone are not always made distinct. The lacuni are very small spaces or cavities for the deposit of lymph; the *canalicuni*, as the term implies, are very fine canals leading to and between these spaces or lacuni. Thus these cavities and canals filled with this lymph constitute the deposit and circulation of fluid throughout the bone. How much more plainly anatomy would be understood if more English and less Latin were used.

The interest of your patients should be uppermost in your mind; study and do everything from this standpoint, and you will find all other interests fall into line.

Collect promptly.—We generally make our own situation. If we allow it to be "generally understood" that we give long time, long time will be taken, but if we expect payment as soon as work is done we shall generally find our patients ready to pay immediately. Don't be afraid of letting your patient know before you begin how much their work is to cost, as near as may be, and when you expect to be through. They will then generally anticipate the presentation of their bill by bringing the money on the conclusion of the work. If circumstances are such they must have time, mutually agree how long time it shall be, and expect it when promised, and not fear to offend by reminding them if they *seem* to forget. If there is to be any complaint of the charge, it is much easier met at the time the work is done than months afterward when part of the labor and difficulties of the dentist is forgotten. Even when a little time is given, if the bill is accepted at the conclusion of the work without complaint, it is not so easy to complain afterward. If a part of the work necessarily reaches through a considerable time, it is better to present your bill for what is done during the month. How many patients go the second time they want dental work done to a second dentist, because they have not paid the first dentist for what he has done. Better by far keep their friendship and their patronage by prompt collections.

Separating the plaster of impression and counter impression, or the upper from the lower half in flasking, soap suds is good. Twenty-five years ago we paid the patentee ten dollars for the privilege of using it. It is much better than to shellac and then oil; for there is no necessity of waiting till the plaster is dry and the result is more satisfactory. By putting in the last plaster a little analine solution, the division line is easily distinguished. Castile soap is best because it is more slippery, penetrates the plaster less, and makes less suds. Use with a lather brush.

To make a knot of a long bone.—To make a practical demonstration, place a long slender bone of a chicken or some small animal in one part hydrochloric acid and sixteen parts water. Change this fluid every day for several days. If a flat or a porous bone is thus macerated, it will become like a sponge.

Organic elements.—It is singular that out of the seventy elements in nature, less than a dozen enter into organic substances. In fact, the greater part of the earth's crust and all compounds of animal and vegetable origin, are formed from about a dozen of these seventy elements.

In giving credit to contempories for what we clip, we all make mistakes. These occasional unintentional slips will be forgiven. But what shall we say of an editor who fills half his editorial department with the editorials of another journal, without giving credit? One of our exchanges for February publishes six editorials of the ITEMS OF INTEREST as its own. Let us hope the omission of credit was unintentional.

Bichloride of Mercury is a stimulant, antiseptic, disinfectant, and powerful germicide. In a strong preparation it is a dangerous escharotic. It is used chiefly as a germicide. 1 gr. Bichloride of Mercury, 40 drops of alcohol, and 3 oz. water, or a dilution of 1 to 1000 is the strength usually employed.

Is the Following Generally Accepted as True?—"A decaying tooth has no destructive influence on other teeth unless in actual contact, but tends to localize the trouble in the mouth, thus exempting for a time other teeth, which are next liable to decay, from any decided disintegrating influence."

Is this Good Doctrine?—"Superficial caries is that stage of decay which permits of its easy removal by the use of files, burs, corundum wheels, and the like. In teeth *liable* to become carious, it should be let alone till its progress indicates intervention by filling."

The Central Dental Association, of Northern New Jersey, has elected the following officers for 1887–88:

President, S. C. G. Watkins, Montclair; Vice President, Geo. E. Adams, South Orange; Secretary, James G. Palmer, New Brunswick; Treasurer, Chas. A. Meeker, Newark. *Executive Committee*, B. F. Luckey, Paterson; Wm. P. Richards, Orange; C. F. Holbrook, Newark; Oscar Adelberg, Elizabeth; Jacob Simonson, Newark.

JAMES G. PALMER, Secretary.

The Nebraska Dental Law, just passed, stipulates that all dentists hereafter entering the State must file with the clerk of the county where he purposes to practice, a diploma from some reputable dental college or dental department of a college. Dentists now in the State must file with the clerk of his county, within ninety days from January 12, 1887, an affidavit that he is practicing dentistry and has been since a specific date.

The penalty for violation is from $50 to $200, or imprisonment for sixty days, or both.

THE TARIFF STRIKES THE DENTAL PROFESSION.

We suppose it is generally known that, even when platina was at its old price of $4.00 or $4.50 an ounce, the amount of this metal in a tooth constituted the greater part of its expense. For the last few years the demand for platina has been so much greater than its supply, its price has gradually advanced till now it costs $7.50 to $8.00 an ounce. It has not been so easy to advance the price of teeth, so that the profit of their manufacture has gradually grown less, till some makers have been obliged to retire, and the others have been put to their wits to sustain themselves.

But now comes a blow from the revenue officer that burries all the manufacturers of the cheaper priced teeth and leaves even the makers of the higher-priced teeth with little profit. Contrary to the ruling of our government since its foundation, the Treasury Department has now decided that platina plate, wire, and even ingots are *manufactured* platina, and therefore subject to a duty of 45 per cent ad valorem, making it almost double its present cost, and two-thirds the price of gold.

The principle on which the tariff is based is, *protection to home industry*, but here there can be no home protection because there is no home product, for all the world is dependant on Russia for platina; at least $\frac{9}{10}$ of all is found in the Ural mountains.

Of course, this means good-by to the "dollar tooth," though the porcelain in them may be as good as the best, the platina required for their pins precludes the possibility of their manufacture. There has been less and less profit in them during all this creeping up in the price of platina, but this last blow crushes them completely. Will this advance the price of all teeth?

The only redeeming feature in connection with the above decision of our custom's authorities is that it may stimulate the developement of another manufacturing industry in our country—that of refining the crude platinum ore which remains duty free, the great and only obstacle in the way being the difficulty of obtaining the ore.

MEETING OF DENTAL SOCIETIES.

Texas, Austin; May 4.
Illinois, Jacksonville; Tuesday, May 10.
Mad River, Dayton; Tuesday, May 17.
Nebraska, Hastings; May 17.
Georgia, Cumberland Island; 4th Tuesday in May.
Minnesota, Winona; May 26.

Miscellaneous.

MEN OF THOT.

A young assistant of chemistry in the Boston Institute of Technology happened some years ago to be in the northern peninsula of Michigan, says the New York *Sun*. While there he observed that the Portage River and Lake Linden were of a peculiar copper color, and, when he asked the cause, was told that it was copper that escaped from the smelting and stamping mills of the Calumet and Hecla mines. The young teacher put his thinking cap on, and then requested the company to allow him to experiment, with a view of saving this copper. The company was only too glad to offer facilities. So the young man gave up his summer vacation and set to work, and was able to devise a method by which about 4 per cent of the copper mined was saved, and almost pure copper, too. The young professor no longer earns a trifling salary, but has acquired a comfortable income by this summer's vacation.

Some years ago, a mechanic near New Haven was riding in a railway train, and was jolted and jarred as in the early days of railway travel passengers were apt to be. He didn't fret and fume, as the other passengers did, but began to study and experiment with a view to making a spring that would reduce the jolting to a minimum. He at last succeeded, and his spring was adopted by every railroad in the country. He is no longer a poor young mechanic. His name is Carlos French, and he has just been elected to Congress from the New Haven district.

There died, a few days ago, in Waterbury, a man who began life in the narrowest circumstances. He learned the trade of a machinist, and he gave his whole soul to his trade. By and by he startled wire manufacturers by producing a cold reducing machine, by which wire was drawn cold. Seeing one day a woman fretting because she had pricked her finger with a pin, he was set to thinking, and in a week had devised the valuable safety pin. His name was E. J. Manville. He died a rich man.

If we take the railway business in all its branches, we shall find that in every one of them the men who now are at the head, and who are getting large salaries and are making money, began life without a cent, except in a very few instances. Thirty odd years ago a rosy-cheeked young man ran one of the engines on the New York and New Haven road. He spent every moment of his spare time in studying mechanical engineering and surveying. Soon his suggestions respecting the building of engines, and also respecting the construction and building department of that road, became so valuable that his services were recognized by promotion. He became assistant superintendent, then general superintendent of the whole system, and is now vice-president and director, and has control of the entire mechanical department of the road. This is E. M. Reed, and when he sees a discontented engineer, he says to him that the opportunities for advancement to-day are just as great, probably greater, than they were

thirty odd years ago, when he fired on the road. Another superintendent, C. N. Davidson, of the Hartford division, years ago stood at the footboard, and secured his promotion because he made his services so valuable that the company could not do else than appoint him to responsible places. The general superintendent of the great Wabash system some years ago was a common telegraph operator in Delphi, Ind., earning barely enough to pay for his board and clothing. But he made a study of the railroad business as opportunity presented in that obscure town. By and by the opportunity came for making a suggestion to the managers. It was a good one. Railway managers are constantly on the lookout for men who show their competency. No men in the world are quicker to recognize and reward fidelity and ability. This operator was promoted to a more responsible post. Here his whole time was given to mastering his duties and bettering the service. So he was promoted again and again, until a year ago he was made the general superintendent of the vast system, and with a salary commensurate with his responsible duties. His name is Wade.

General Superintendent Kerrigan, of the whole five or six thousand miles of the Missouri Pacific system, began his career as an ordinary axman on the Iron Mountain road. He handled the ax well, and was next made rodman. He was absorbed in his work, and the company recognized his industry and value, and to-day he receives $10,000 a year for managing the system. The late Vice-President Hoxie himself, whom the Knights of Labor regarded with so much bitterness, was in his early life a laboring man, even performing such duties as taking care of horses. But he did that work thoroughly, and when he was twitted with having once been a hostler, he laughed, and replied: "Yes, and I was the best one in Des Moines."

The late President Rutter, of the New York Central road, began life as a station agent on the line of the Erie road, but he wasn't satisfied simply with being prompt and accurate with his accounts. He made a study of the freight business, so far as he could at his station, and opened the eyes of his manager with his valuable suggestions and his quick and successful solution of some of the troublesome problems of freight transportation that he had to meet in that early day, before the business was systematized and so well understood as now.

Some years ago two long freight trains met at a siding on one of the Illinois prairies. The siding was not long enough to allow the trains to pass. The assistant manager of the road happened to be on one of the trains, and he was at his wits' end to know what to do. There stepped up a young brakeman, who said he could manage the trains so as to enable them to pass. The engineers laughed at him, but the manager asked him to explain. With a stick he traced in the ground his plan, and it was so simple that every one at once comprehended it. In fifteen minutes the two trains had been moved by, and the operation is now universally adopted on sidings that are too short. It is called sawing. The young fellow, while riding on the top of his car across the dreary prairies, had studied out and solved the problem, and when the opportunity came, he was ready for it. He is now the general manager of the great Northwestern system.

The Lobster may be taken as a typical example of the crustacea. The segmentary or ring-like structure is very prominent. The legs of the animal are attached to the lower part of the thoracic segments. At the base of the legs or claws we find a little plume-like appendage, which represents the gills of fishes. These little bunches contain hundreds of ramifying tubes, by which the creature abstracts oxygen from the water. Each ring in the body has its pair of separate appendages, and the different segments of the body are analogous to one another. The rear segments of the body are modified into a flat fin or tail, by which the animal swims through the water, and are so powerful that he has been known to jump backwards a distance of fifteen feet. The ovaries are commonly known as the "coral;" and the eggs, when extruded, adhere to the under side of the tail, which is covered with a viscid substance. In the eyes there are the proper arrangements for discerning light; and they are placed at the end of movable processes, which enables the animal to look in two directions at once.

The ears of the lobster are little open cavities, which are filled with water, and contain grains of sand. Sound undulations in the water cause these grains to jar against the hairs with which the ear is lined, producing a sensation analogous to sound; but the extent to which the sense is developed is unknown. The lobster is the scavenger of the sea; and wherever any garbage or decaying matter is found, he is pretty sure to be present. But, before passing into his organization, the chemical composition of his food is so changed, that we need have no misgivings about enjoying our salads. They are very pugnacious, and in their battles frequently lose a claw or two, which shortly grow out again.

The Grasshopper is a common and typical example of this class. He has compound eyes, made up of an innumerable number of facets. Under a microscope it resembles a piece of mosaic work. Each facet is a complete visual organ; and the grasshopper, looking at a blade of grass, for instance, actually sees several thousand. Probably, like the inversion of objects upon the human retina, continued practice enables the insect to judge correctly of the actual number.

The grasshopper, like other insects, breathes through openings in the side of his body; from these openings, tubes known as spiracles extend with innumerable ramifications to all parts of his body. The air, passing through these tubes, comes into contact with the blood-vessels, and supplies the blood with oxygen. These tubes can be easily found in the body of a fly or other insect, and examined under the microscope. A most wonderful circumstance connected with their structure is, that they are lined on the inside with a sort of spiral spring, which coils around their entire length, strengthening them, and preventing them from collapsing. A similar arrangement has long been used to strengthen rubber gas-tubes.

To Make Clear Shellac Varnish.—Cut with alcohol in the usual way, then add a little benzole and shake well. In two days the varnish will be divided into two strata, the upper a clear dark red, the under containing the impurities.